

## ABSTRACT OF THE DISCLOSURE

The inventive bioprocessing system (and technique) relies on non-invasive optical chemical sensing technology wherein an optical excitation source excites an optical chemical sensor. The optical chemical sensor then emits luminescence or absorbs light which is measured by a detector. The luminescence emitted from the chemical sensor or the amount of light absorbed by the chemical sensor is related to the concentration of an analyte, such as oxygen. If the luminescence emitted changes, or if the amount of light absorbed changes, then the concentration of the analyte has changed. Using such a system to measure and adjust multiple parameters at one time allows one to efficiently and cost-effectively determine optimal conditions for a given cell type and/or cell environment, for example. By combining cell cultivation with optical chemical sensing technology, cultivation can be successfully and rapidly performed, controlled and monitored in small volumes in an automated, parallel fashion at less expense than current bioprocess techniques.